ESO 2357

DISCUSSION OF PROPOSED CHANGE IN CHICAGO BOARD OF TRADE DELIVERY AREA FOR CORN AND SOYBEAN FUTURES CONTRACTS

Carl R. Zulauf and Scott H. Irwin*

June 1997

Department of Agricultural Economics
The Ohio State University
103 Ag. Admin. Bldg.
2120 Fyffe Road
Columbus, Ohio 43210

* Associate Professor and McCormick Professor, respectively.

The authors thank Jeff Goodbar and Sharon Thayer Baxter for their assistance with the analysis.

DISCUSSION OF PROPOSED CHANGE IN CHICAGO BOARD OF TRADE DELIVERY AREA FOR CORN AND SOYBEAN FUTURES CONTRACTS

***ISSUE**: The Chicago Board of Trade proposes to change the delivery specifications on its corn and soybean futures contracts to an Illinois Waterway Delivery System. Toledo, Ohio and St. Louis, Missouri will no longer be delivery points.*

BACKGROUND

- Concern has been growing for some time over the performance of the current delivery process used for agricultural futures at the Chicago Board of Trade (CBOT). This concern received major impetus with the episode involving the July 1989 soybean contract (Peck and Williams). Another round of concern emerged with the price run-up during the expiration of trading on the March 1996 wheat contract.

- The primary functions of futures markets are to provide a mechanism (1) for discovery of future prices (as opposed to cash, i.e., current prices) and (2) for commercial enterprises to augment their cash marketing strategies by using futures contracts as temporary substitutes for cash market positions. The motivation for using futures contracts is to enhance returns and/or reduce risk.

- Futures prices are tied to cash prices via a delivery process. This process involves either physical delivery of the commodity, as for grains, or cash settlement, as for feeder cattle. Delivery ensures that the price of futures and cash contracts do not diverge from each other by more than the cost of arbitraging the difference between the two types of contracts. Therefore, delivery increases the usefulness of futures markets to commercial enterprises as a price discovery tool and creates a better balance between the profit opportunities available to hedgers and speculators.

- Given that delivery represents an interface between cash and futures markets, the delivery characteristics must be consistent with accepted commercial practice. As accepted commercial practices change, delivery specifications must also change to assure performance of the futures market. For example, the decline of Chicago as a cash grain market led to the designation of Toledo, Ohio and St. Louis, Missouri as delivery areas for corn beginning with the December 1976 futures contract. For soybeans, Toledo was added as a delivery area beginning with the November 1979 contract, while St. Louis was added beginning with the November 1992 contract.

- Dr. T. A. Hieronymus, Professor Emeritus at the University of Illinois, conceptualizes the delivery process on futures contracts as a sampling of value in the cash market. In order for this sampling to be representative of cash market value, delivery needs to occur within the normal commercial flow of the commodity. We think this is an excellent conceptualization, but would add one point. A well-accepted economic concept is that prices are determined by changes in supply and demand at the margin. The marginal price determinant varies from year to year, but, at least since the early 1970s, exports have been an on-going and important marginal price determinant for U.S. grains and oilseeds. Concern has been raised that Chicago and Toledo, the two primary delivery points, are out-of-position with respect to the export market, i.e., with respect to marginal price discovery. Exports from these two locations generally go out the Great Lakes, whereas the Mississippi River System is the primary conduit for exports. The conceptual argument of Dr. Hieronymous, as augmented by the idea of marginal price formation, implies that the current delivery process reduces the efficiency of price discovery by the CBOT grain and oilseed futures markets.

- Another concern with the current delivery system is that significant deliveries occur at both Chicago and Toledo. This can create uncertainty regarding the location of delivery, which in turn may cause the basis (i.e., difference between futures and cash prices) to become more variable. Increased basis variability usually reduces the effectiveness of futures markets to commercial users, requiring them to either increase prices paid by consumers and/or reduce prices paid to producers.

- Contract specifications have historically been under the auspices of futures exchanges. The Commodity Futures Trading Commission does have the power to change delivery specifications if it concludes that delivery does not adequately diminish market manipulation, abnormal movement, and/or market congestion. Occurrence of these events increase basis variability, thus reducing the usefulness of futures market to commercial users. However, basis variability exists for many reasons. Thus, a change in delivery specification could increase basis variability while adequately diminishing market manipulation, abnormal movement, and market congestion. Hence a broader economic concern is the impact of the proposed change in delivery specifications on basis variability.

POTENTIAL IMPACT OF PROPOSED CHANGE IN DELIVERY SPECIFICATIONS

→ *NATIONAL IMPACT*: The proposed change to an Illinois Waterway Delivery System clearly ties the CBOT futures markets to the most important marginal pricing determinant for U.S. corn and soybeans, i.e., the export market. This change should increase the efficiency of price discovery, which in turn should increase the economic well-being of consumers and producers. The potential magnitude of this improvement can not be estimated empirically because the necessary data do not exist and our analytical tools are not sufficiently precise to permit determination of what is likely to be a small value on a per bushel basis. The value is likely to be small because the currently-specified futures markets are considered to be fairly efficient. However, a small value on a per unit basis can add up to a large value on an aggregate basis. For the sake of argument, let us suppose that the proposed change in the delivery process increases economic performance by one-eighth of a cent per bushel of corn and soybeans. This is the minimum price tick on the CBOT corn and soybean contracts. The U.S. produced 11.6 billion bushels of corn and soybeans in 1996. Multiplying this amount by one-eighth of a cent yields $14.6 million in improved economic performance. This can benefit farmers, consumers, and/or middlemen.

→ *REGIONAL IMPACT:* It is possible that the proposed change in the delivery specifications could impact various regions differently. However, because the current pricing system is believed to be fairly efficient, any regional impact is expected to be small, whether it is positive or negative. A reasonable starting point is that producers in the central and western corn and soybean production regions will gain because the proposed elimination of Toledo as a delivery alternative ties delivery more closely to their production region. This gain is expected because of the national impact discussed above, as well as the potential for reduced basis variability due to only one delivery area. On the other hand, farmers and agribusinesses in the eastern production region, especially those tied to the Toledo market, could see a reduction in their economic well-being because of the loss of Toledo as a delivery area. To examine this concern, the impact of adding Toledo as a delivery area in 1976 for corn is evaluated.

➤ *ANALYSIS*: The basis for Ohio corn was examined over the period spanned by the 1964/65 crop marketing year through the 1996/97 crop year. Since the loss of Toledo as a delivery area is expected to have its largest impact during the delivery month, the analysis is limited to the delivery period of the December, March, and May futures contracts. The delivery period begins on the first and ends around the twentieth of the delivery month. The impact of delivery on prices should be greater during December and March because the Great Lakes are closed for shipping. Thus, the analysis is focused on those months when the impact of delivery should be greatest. Last, average cash prices for corn sold in Ohio were available only for Tuesday. Thus, two to four basis observations were available during each delivery period.

➤ *RESULTS FOR BASIS LEVEL*: A figure attached at the end of this article contains the average basis observed for each crop marketing year between 1964/65 and 1996/97. The average Tuesday delivery basis for the December, March, and May contracts over the period from the 1964/65 through the 1975/76 crop years, i.e. the period before Toledo was a delivery area, was 13.0 cents. The basis is defined as futures price minus cash price, thus the futures price averaged 13 cents higher than the cash price. In the period since the addition of Toledo as a delivery area, the basis has averaged 10.7 cents. This implies that the cash price has increased relative to the futures price. Regression analysis is a statistical tool which can provide an indication of the statistical significance of a variable, as well as of the explanatory power of the variable. Regression analysis found that the Toledo delivery variable was significant at the 84 percent confidence level. This difference is not statistically significant at the 95 percent confidence test level, which is a conventionally-accepted test value. Thus, by conventional scientific standards, it is not reliable to ascribe the variation in the basis observed over the analysis period to the addition of Toledo as a delivery area. The regression analysis found that the addition of Toledo as a delivery area explained only two percent (of a possible 100 percent) of the variation in the Ohio cash basis before and after 1976.

  * The basis is influenced by all factors that affect supply and demand in both the local market and the global market. Thus, the addition of Toledo as a delivery area is only one of many variables which could have influenced the basis. Furthermore, substantial changes occurred in the U.S. grain market over the analysis period. These include changes in private market supply and demand, as well as government programs. A potentially important variable relative to the Ohio corn market is the dramatic increase in hog and poultry production in the southeastern part of the U.S. We measure this variable by using a simple proxy variable: the live weight of hogs produced in the state

of North Carolina. In contrast to the addition of Toledo as a delivery area, regression analysis found that North Carolina hog production had a positive impact on the Ohio corn basis and was statistically significant at the 99 percent confidence level (i.e., it is statistically significant by conventional scientific standards). Incorporating North Carolina hog production into the analysis reduced the confidence level associated with the Toledo delivery variable from 84 percent to 11 percent. This finding underscores the lack of statistical significance regarding the impact on the Ohio corn market of adding Toledo as a delivery area. Despite its statistical significance, North Carolina hog production explained only nine percent of the variation in the Ohio cash basis observed since 1964. This small explanatory power underscores the previous observation that many factors influence the basis.

➤ *RESULTS FOR BASIS VARIABILITY:* As discussed above, basis variability is an important issue. A conventional measure of variability is standard deviation. Standard deviation of the December, March, and May basis was 7.4 cents per bushel over the 1964/65 - 1975/76 period and 8.1 cents per bushel over the 1976/77 - 1996/97 period. This difference is not statistically significant at the 95 percent test level. The ratio of the standard deviation to the average basis, another measure of variability, was 57 percent in the pre-1976 period and 76 percent in the post-1976 period. Both measures are consistent with the conclusion that the variability of the Ohio corn basis did not decrease when Toledo was added as a delivery area.

➤ *DISCUSSION OF RESULTS*: We suggest that the lack of statistical significance associated with the addition of Toledo as a delivery area is intuitively appealing. Delivery does not involve the physical disappearance of the commodity. After its use in the delivery process, the commodity must still be physically consumed, such as fed to livestock, shipped to a processor, or exported. Hence, it is reasonable to expect that delivery should have little lasting impact on local supply and demand, and hence on the local cash market.

➤ *LIMITATIONS OF RESULTS*: Our analysis of the impact of adding Toledo as a delivery point for corn in 1976 is a "quick and dirty" analysis. A more thorough analysis requires the specification of a complete model of factors that could have affected the corn basis in Ohio over the analysis period. These factors include not only the addition of Toledo as a delivery point and livestock production in the southeast, but also, among others, changes in the transportation system, interest rates, farm policy, storage capacity, and processing capacity. Development of a fully specified model will require substantial effort. Furthermore, it is desirable to analyze the behavior of the basis at other points in the marketing channel over the analysis period. The analysis of different marketing points permits a comparative analysis that could determine if changes in the Ohio corn basis were unique to Ohio or part of broader changes in the U.S. corn market.

SUMMARY

❶ Our statistical analysis suggests that the addition of Toledo as a delivery area in 1976 had no identifiable impact upon the Ohio corn market. This implies that the removal of Toledo as a delivery area is unlikely to have an identifiable impact upon the Ohio corn market. The analysis has limitations, but we believe it provides insights into the "order of magnitude" associated with the impact of having Toledo as a delivery area.

❷ It is important to emphasize that it will never be possible to conduct the preferred analysis. The preferred analysis is to compare the proposed change with the current situation. Unfortunately, the proposed change is a complex set of changes that involve more than just a change in delivery area. For example, the proposal also calls for delivery to move from the use of warehouse receipts to the use of shipping certificates. As a package, the proposed set of changes has never been tried before. Thus, it is impossible to conduct the appropriate empirical analysis. Hence, one is left only with doing the best empirical analysis possible and with relying on conceptual arguments.

❸ The conceptual arguments suggest that the efficiency and performance of the U.S. grain marketing system should be improved by the proposed change in delivery specifications.

❹ The proposed change does represent a significant change in contract delivery specifications. If concern exists about the potential for unknown consequences, one option is to implement the change for only one commodity as a pilot experiment. Another option is to let the market determine which contract specification it prefers. Two contracts could be traded: one using the current delivery process and the other using the proposed change. There is historical precedence for the listing of alternative contract specifications. The market probably will quickly determine which contract specification it wants to trade because liquidity is not large enough to support both contract specifications. There are costs associated with the second option: potential liquidity concerns noted in the previous sentence, cost to the exchange of monitoring both contracts, and potential confusion among market participants. The benefits and costs would have to be weighed against one another.

❺ A last issue is whether there needs to be an alternative delivery area that could be used if an unusual market situation exists, such as market manipulation, abnormal movement, or market congestion. If a secondary delivery area is desired, it is imperative that it be priced at a punitive adjustment so there is no ambiguity as to the primary delivery area. Otherwise, uncertainty regarding the location of delivery arises.

REFERENCES

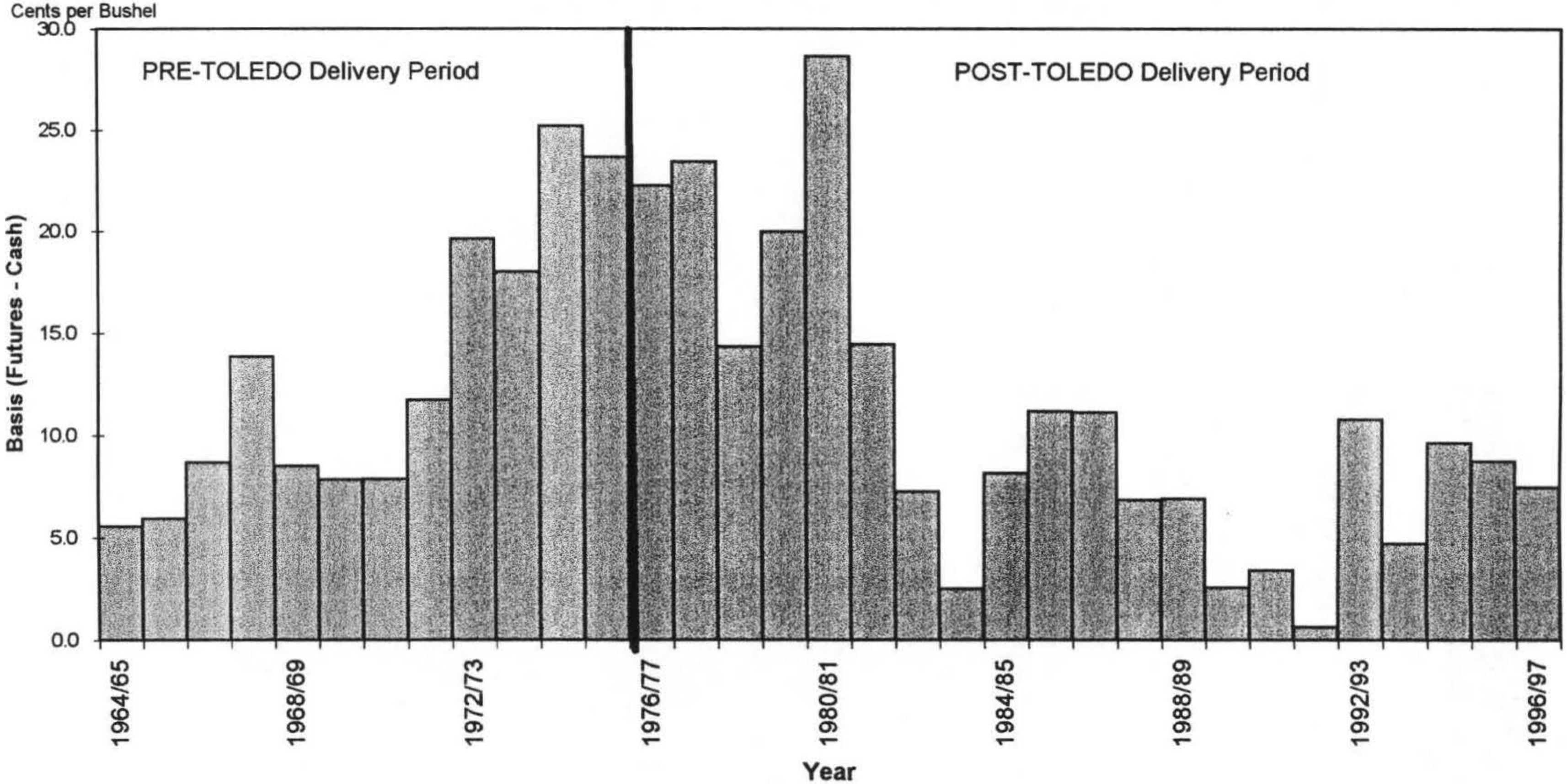
Hieronymus, T. A. (editor). "Designation of Delivery Points." *A Revisionist Chronology of Papers by T. A. Hieronymus*. University of Illinois at Urbana-Champaign, Office for Futures and Options Research. 1996. Pages 333 - 338.

Hieronymus, T. A. "Comment on Delivery Specifications for Corn and Soybeans on CBOT Futures Contracts." University of Illinois at Urbana-Champaign, Department of Agricultural and Consumer Economics. May 14, 1997.

Peck, Anne E. and Jeffrey C. Williams. *An Evaluation of the Performance of the Chicago Board of Trade Wheat, Corn, and Soybean Futures Contracts During Delivery Periods from 1964-65 Through 1988-89*. Report to the National Grain and Feed Association. April 1991.

NOTE: Details of the empirical analysis are available from the authors.

Average Tuesday Basis by Crop Marketing Year, Ohio Cash Price, 1964-1997.



* Basis was calculated for the delivery period of the December, March, and May futures contracts.

* Toledo became a delivery area beginning with the December 1976 futures contract.